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10/522,076	01/21/2005	Haydn N. G. Wadley	3053.150.US	5836

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EXAMINER	
LOUIE, MANDY C	

ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/522,076	WADLEY ET AL.	
	Examiner	Art Unit	
	MANDY C. LOUIE	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *16-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 January 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1-15, in the reply filed on 08/25/08 is acknowledged. The traversal is on the ground(s) that the present claim are drawn to a product, a process specially adapted for manufacture of said product, and an apparatus or means specially designed for carrying out the said process. This is not found persuasive because a group of inventions is considered when linked to form a single inventive concept by a common special technical feature; upon which a special technical feature was found (37 CFR 1.475(a)) and disclosed by the prior art. Where, it can be established that when a special technical feature is known, there is a lack of unity found under *a posteriori*. (See MPEP 1850.II).

The requirement is still deemed proper and is therefore made FINAL.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: (2), (60), (59) in Fig. 4 and (230), (220) in Fig. 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the

immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. The instant claims are drawn to a method for forming a thermal barrier coating system, the method comprising: presenting at least one substrate; forming a bond coat on a portion of the substrate by directed vapor deposition (DVD) technique; reactively forming dispersoids in the bond coat; and depositing a thermal-insulating layer on the bond coat. Subsequent limitations will further be disclosed.

5. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian [US 6258467] in view of Hirsch et al. [US 4101713].

Regarding claim 1, Subramanian teaches an invention of a thermal barrier coating (TBC) [abstract], where the prior art further discloses a method of producing a device with the TBC (thermal barrier coating system) by providing a substrate (presenting at least one substrate); depositing a bond coat (forming a bond coat) and then depositing a ceramic thermal barrier layer over the bond coat (depositing a thermal insulating layer on said bond coat) [col 3, ln 44-48], where the bond coat (basecoat) is formed on a substrate (forming a bond coat at least a portion of at least one said substrate) [Fig. 2]. Subramanian also provides a list of deposition techniques for depositing such thermal barrier coating system where the bond coat can be formed by an electron beam directed vapor deposition technique (DVD technique) [col 4, ln 58-61;

col 4, ln 2]. Subramanian fails to explicitly teach forming dispersoids in the bond coat. Hirsch et al. teaches this deficiency.

Regarding claim 1, Hirsch et al .teaches a flame sprayed coated article [abstract], where the prior art discloses the coating composition includes a hard phase or dispersoids [col 2, ln 51-52], where dispersoids coating phases are associated with applications that are exposed to high temperatures [col 4, ln 40-46]. It would have been obvious to one with ordinary skill in the art at the time of the invention to apply dispersoids taught by Hirsch et al. to be incorporated into the bond coat of the thermal barrier coating system taught by Subramanian. One would have been motivated to do so effectively strengthen the a coating composition [Hirsch et al., col 2, ln 54-56] such as a bond coat, to significantly improve the maintenance of the mechanical integrity of the coating throughout the thickness of the coating especially at high temperature [Hirsch et al., col 4, ln 41-45], and to increase the resistance to transmission stress through out the matrix of the coating which would lengthen the service life of the product [Hirsch et al., col 4, ln 47-52].

Regarding claims 2-3, Subramanian in view of Hirsch et al. exemplifies the dispersoids comprising yttrium oxide (oxygen compound, oxide) [Hirsch et al., col 2, ln 51-55].

6. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian in view of Hirsch et al., further in view of Cleveland et al. [Dynamics of Cluster-Surface Collision].

Teaching of Subramanian in view of Hirsch et al. is aforementioned (where the dispersoids can range in particle sizes of 50-1000 Angstroms (5-100 nanometers) [Hirsch et al., col 4, ln 33-37]), but fails to teach providing nanoclusters under pressure greater than the chamber pressure; and injecting said nanoclusters at a high velocity into the chamber, thereby resulting in dispersoids impinged in the bond coat. Cleveland teaches this deficiency.

Regarding claim 14, Cleveland et al .teaches a study on structure, energy and dynamics of shock conditions generated in a nano-cluster upon impact of a surface [abstract], where the nano-shock phenomenon (upon surface collision) leads to severe compression of the cluster accompanied by extreme pressure (up to 10 to 12 GPa) (higher pressure than the chamber pressure) [col 3, pg. 355] under the conditions of high incident velocity which the nano-cluster impinges upon the substrate [col 1, pg 357]. It would have been apparent to one with ordinary skill in the art that the substrate would be enclosed in a chamber upon processing or impinging the nanoclusters to contain the process. It would have been obvious to one with ordinary skill in the art at the time of the invention to inject nanoclusters at a high velocity as taught by Cleveland et al. under high pressure to be incorporated into the bond coat of the thermal barrier coating system taught by Subramanian in view of Hirsch et al. One would have been motivated to do so successfully activate surface modifications and induce physical processes in a nonequilibrium cluster environment [Cleveland et al., col 3, pg 355], while being able to penetrate into the coat while maintaining its cluster-like shape and

localizing the impact area [Cleveland et al., col 1, pg 357] to yield effective dispersoids within the coat.

Regarding claim 15, Subramanian in view of Hirsch et al. and Cleveland et al. teaches depositing a thermal insulating layer on the bond coat [Subramanian, col 3, ln 45-46].

7. Claims 4-5, 9-10, 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian in view of Hirsch et al., further in view of Wadley et al. [US 5736073] and Mikoshiba et al. [US 4989541].

Teaching of Subramanian in view of Hirsch et al. is aforementioned; however, fails to explicitly teach the DVD technique comprising: presenting a substrate to a chamber that has an operating pressure of about 0.1 to 32350 Pa; presenting at least one evaporant source; presenting at least one carrier gas; impinging the evaporant source with an energetic beam in the chamber to generate an evaporated vapor flux in a main direction; and deflecting one of the generate evaporated vapor flux with the carrier gas stream, which the carrier gas stream is parallel to the main direction and surrounds the evaporated flux, where the evaporated flux coats the substrate. Wadley et al. and Mikoshiba et al. teach this deficiency.

Regarding claim 4, Wadley et al. teaches a process for vapor depositing an evaporant onto a substrate [abstract] through directed vapor deposition of electron beam evaporant [title] by presenting the substrate to a chamber, where the chamber has an operating pressure of 0.001 Torr (0.14 Pa) to atmospheric pressure; providing a carrier gas stream and an evaporant source to the chamber; impinging the evaporant

source with an electron beam (within the chamber) to generate an evaporant (evaporated vapor flux); entraining the evaporant in the carrier gas stream; and coating the substrate with the carrier gas stream with the evaporant [col 6, ln 1-13; Fig. 1]. Fig. 1 also illustrates the evaporant (evaporated vapor flux) in a main direction towards the substrate in respect of evaporant sources impinged by the electron beam (energetic beam). It would have been apparent to one with ordinary skill in the art that by entraining the evaporant (evaporated vapor flux) within the carrier gas stream, any oblique evaporant would be deflected from the carrier gas stream to become entrained in a main direction and channeled towards coating the substrate. Fig. 1 also further displays the carrier gas stream is parallel to the main direction. It would have been obvious to one with ordinary skill in the art at the time of the invention to model the directed vapor deposition technique as described by Subramanian in view of Hirsch et al. after the method taught by Wadley et al. One would have been motivated to do so in order to provide a directed vapor deposition using an electron beam evaporant that would make efficient use of the evaporant source materials, provide rapid deposition and have high flexibility [Wadley et al., col 4, ln 55-63]. However, Wadley et al. fails to explicitly teach the carrier gas surrounding the evaporated flux. Mikoshiba et al. teaches this deficiency.

Regarding claim 4, Mikoshiba et al. teaches a thin film forming apparatus which comprises a control gas nozzle for encircling a material gas flow [abstract]. Where the prior art teaches a material gas is encircled (surrounded) by the jetting control gas (carrier gas) [col 2, ln 66-68] to form a sheath flow [col 3, ln 16]. Fig 1A further illustrates

the material gas being surrounded by the jetting control gas that is parallel to the main direction of the material gas, and is shaped into a beam upon which directed towards a substrate in a chamber. It would have been obvious to one with ordinary skill in the art at the time of the invention to incorporate the ring-shaped nozzle taught by Mikoshiba et al. into nozzle used for the deposition process of Subramanian in view of Hirsch et al. and Wadley to surround the evaporated vapor flux. One would have been motivated to do so in order to control the gas flow so that the evaporated vapor flux would not contaminated the walls of the reaction chamber [Mikoshiba et al. col 2, ln 14-16] or so the evaporated vapor material would not be contaminated, vice versa.

Regarding claim 5, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. teaches the energetic beam comprises an electron beam source [Wadley et al., col 6, ln 8; Fig. 1 (30, 40)].

Regarding claim 9, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. teaches the carrier gas stream is generated from a nozzle, where the evaporant source can be disposed in the nozzle [Wadley et al., col 7, ln 7-10]; the nozzle comprises a nozzle gap from wherein a carrier gas flow flows from [Mikoshiba et al. Fig. 1D (6a)] and a second nozzle, 2 (evaporant retainer) for containing material gas flow (evaporant source) [Mikoshiba et al., col 3, ln 12-13], where the second nozzle, 2 is surrounded by the nozzle gap (6a) [Mikoshiba et al. Fig 1D] to efficiently form a gas sheath around the evaporant, wherein the second nozzle would be substituted for the evaporant retainer taught by Wadley et al. for a direct vapor deposition.

Regarding claim 10, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. teaches the evaporant retainer can be a crucible [Wadley et al., col 11, ln 30-31].

Regarding claims 12-13, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. teaches the evaporant source can be made from an alloy comprising Co [Subramanian, col 4, ln 54-56].

8. Claims 6-8, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian in view of Hirsch et al. and Wadley et al. and Mikoshiba et al., further in view of Neumann et al. [US 5846608].

Teaching of Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. fails to teach the limitations of claim 6, Neumann et al. teaches these limitations.

Regarding claim 6, Neumann et al. teaches a process for depositing a coating such as a barrier coating on a substrate [abstract], where a plasma is produced between a coating source and the substrate to accelerate ions towards the substrate, and the method may include applying alternative negative and positive voltage (alternating potential) to the substrate [col 3, ln 6-10]; while the system of the prior art may further include a hollow-cathode arc sources [col 4, ln 48-49] to create the plasma. It would have been apparent to one with ordinary skill in the art that the hollow-cathode arc source would be used to ionize the carrier gas and evaporating material to attract such ionized gases to the biased substrate. It would have been obvious to one with ordinary skill in the art to include a hollow cathode arc source as taught by Neumann et

al. to the process of Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. to create a plasma within the chamber. One would have been motivated to do so in order to do so to produce a higher plasma density, which is necessary for depositing high-quality coatings or to achieve high coating rates [Neumann et al. col 7, ln 30-32] and to decrease the usage of high-frequencies in order to decrease operation costs.

Regarding claim 7, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. and Neumann et al. teaches the hollow cathode source is positioned (regulated for direction) for being adapted to a plurality of evaporators yielding vapor stream (variation in the quantity of working gas passing through plasma) [Neumann et al., col 4, ln 50-60].

Regarding claim 8, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. and Neumann et al. teaches the hollow cathode arc source is positioned between the coating source and the substrate (distance between said cathode source and evaporated vapor flux is regulated) [Neumann et al., col 4, ln 48-51]; where Fig. 3 of Neumann et al. illustrates the entire evaporated vapor flux is ionized. It would have been obvious to one with ordinary skill in the art to optimize this distance as a result effective variable to ionized most of the vapor stream through routine experimentation.

Regarding claims 7-8, the hollow cathode arc source would have been a workable condition to one with ordinary skill in the art, such that the plasma technique

would be dependent upon the quantity of the material supplied, and therefore can be optimized.

Regarding claim 11, Subramanian in view of Hirsch et al. in view of Wadley et al. and Mikoshiba et al. and Neumann et al. are aforementioned, and further teaches the low-voltage electron beam (low energy beam) produced by the hollow cathode source is used to ionize the evaporated vapor flux [Neumann et al., col 11, ln 14-21].

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 11-22 of

copending Application No. 10/476309 (hereinafter '309) in view of Hirsch et al. and Wadley et al. and Neumann et al. and Cleveland et al.

Claims 1-5 are rejected under '309 in view of Hirsch et al., where Hirsch et al. teaches forming specific dispersoids in a bond coat. It would have been obvious to introduce dispersoids to strengthen the bond coat.

Claims 6-8, 11 are rejected under '309 in view of Hirsch et al. and Neumann et al., where Neumann et al. teaches using a hallow cathode arc source (with a low energy beam) to create a plasma. It would have been obvious to create a plasma to fabricate a higher quality coat.

Claims 9-10, 12-13 are rejected under '309 in view of Hirsch et al. and Wadley et al., where Wadley et al. teaches the specific evaporants in Table 1. It would have been obvious to use these evaporants to achieve the desirable compound coating for the thermal barrier coating system that would have desirable material properties.

Claims 14-15 are rejected under '309 in view of Hirsch et al. and Cleveland et al., where Cleveland et al. teaches injecting nanoclusters to form dispersoids under certain conditions. It would have been obvious to inject nanoclusters to form dispersoids to ensure the dispersoids are embedded into the bond coat while maintaining shape.

This is a provisional obviousness-type double patenting rejection.

11. Claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-29, 58-71 of

copending Application No. 10/533993 (hereinafter '993) in view of Hirsch et al. and Mikoshiba et al. and Cleveland et al.

Claims 1-8, 11-13 are rejected under '993 in view of Hirsch et al., where Hirsch et al. teaches forming specific dispersoids in a bond coat. It would have been obvious to introduce dispersoids to strengthen the bond coat.

Claims 9-10, are rejected under '993 in view of Hirsch et al. and Mikoshiba et al, where Mikoshiba et al. teaches using a specific nozzle that would surround the material gas with a carrier gas (where '993 teaches a crucible). It would have been obvious to incorporate such nozzle arrangement to prevent contamination.

Claims 14-15 are rejected under '993 in view of Hirsch et al. and Cleveland et al., where Cleveland et al. teaches injecting nanoclusters to form dispersoids under certain conditions. It would have been obvious to inject nanoclusters to form dispersoids to ensure the dispersoids are embedded into the bond coat while maintaining shape.

This is a provisional obviousness-type double patenting rejection.

12. Claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-25, 42-43 of copending Application No. 10/489090 (hereinafter '090) in view of Hirsch et al. and Neumann et al.

Claims 1-10, 12-15 are rejected under '090 in view of Hirsch et al., where Hirsch et al. teaches forming specific dispersoids in a bond coat. It would have been obvious to introduce dispersoids to strengthen the bond coat.

Claims 9 is rejected under '090 in view of Hirsch et al. and Neumann et al, where Neumann et al. teaches the hallow cathode arc utilizes low energy beam to ionize evaporants. It would have been obvious to include such a low voltage hallow cathode arc source to create a plasma to create a high quality coat without damage.

This is a provisional obviousness-type double patenting rejection.

13. Claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-59 of copending Application No. 10/535364 (hereinafter '364) in view of Hirsch et al. and Wadley et al. and Cleveland et al.

Claims 1-11 are rejected under '364 in view of Hirsch et al., where Hirsch et al. teaches forming specific dispersoids in a bond coat. It would have been obvious to introduce dispersoids to strengthen the bond coat.

Claims 12-13 are rejected under '364 in view of Hirsch et al. and Wadley et al., where Wadley et al. teaches the specific evaporants in Table 1. It would have been obvious to use these evaporants to achieve the desirable compound coating for the thermal barrier coating system that would have desirable material properties.

Claims 14-15 are rejected under '364 in view of Hirsch et al. and Cleveland et al., where Cleveland et al. teaches injecting nanoclusters to form dispersoids under certain conditions. It would have been obvious to inject nanoclusters to form dispersoids to ensure the dispersoids are embedded into the bond coat while maintaining shape.

This is a provisional obviousness-type double patenting rejection.

14. Claims 1-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-76 of copending Application No. 11/917585 (hereinafter '585) in view of Hirsch et al. and Wadley et al. and Cleveland et al.

Claims 1-11 are rejected under '585 in view of Hirsch et al., where Hirsch et al. teaches forming specific dispersoids in a bond coat. It would have been obvious to introduce dispersoids to strengthen the bond coat.

Claims 12-13 are rejected under '585 in view of Hirsch et al. and Wadley et al., where Wadley et al. teaches the specific evaporants in Table 1. It would have been obvious to use these evaporants to achieve the desirable compound coating for the thermal barrier coating system that would have desirable material properties.

Claims 14-15 are rejected under '585 in view of Hirsch et al. and Cleveland et al., where Cleveland et al. teaches injecting nanoclusters to form dispersoids under certain conditions. It would have been obvious to inject nanoclusters to form dispersoids to ensure the dispersoids are embedded into the bond coat while maintaining shape.

This is a provisional obviousness-type double patenting rejection.

Conclusion

1. No claim is allowed.
2. All the pending claims are subject to restriction/election requirement.
3. Claims 16-30 are withdrawn from restriction election.

4. Claims 1-15 are rejected for the reasons aforementioned.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C. LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday, 7:30AM - 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. C. L./
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792